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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/801,080	03/07/2001	Natalino Giorgio Busa	NL000133	5082

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EXAMINER

GERSTL, SHANE F

ART UNIT	PAPER NUMBER
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2183

DATE MAILED: 01/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/801,080

Applicant(s)

BUSA ET AL.

Examiner

Shane F Gerstl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2002 and 28 May 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☒ Interview Summary (PTO-413) Paper No(s). 6.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

DETAILED ACTION

1. Claims 1-7 have been examined.

Papers Received

2. Receipt is acknowledged of Declaration, Extension, and Search Report papers submitted, where the papers have been placed of record in the file.
3. The patents cited in the search report have not been considered because a copy of the references has not been included as necessitated by 37 CFR 1.98.

Specification

4. The disclosure is objected to because of the following informalities: there are no section headings anywhere in the disclosure except for the abstract.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.

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- (1) Field of the Invention.
- (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

5. The abstract of the disclosure is objected to because it is not completely clear why the phrase "Figure 1" is placed under the abstract. The examiner believes the applicant is trying to refer to the figure as the location of the reference characters in the abstract. Therefore, the reference figures are also unclear. The examiner suggests removing the references to the figures all together so that the abstract can stand alone.

Correction is required. See MPEP § 608.01(b).

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The legal term means is used in line 3.

6. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

7. The attempt to incorporate subject matter into this application by reference to the references listed in the specification is improper because it cannot be determined if these references are actually meant to be incorporated by reference or simply as background material such as in an information disclosure statement.

8. The disclosure is objected to because of the following informalities: the references enclosed in brackets ("[]") such as that on line 30 of page 5 are unclear because it is not certain whether the reference characters are meant to refer back to the references of the reference section or to a section of the figures. Further inhibiting clarity on if the references are referring to the reference publications is that the titles of the publications don't always seem to match with the subject being referred to and since copies of the references have not been provided, there is no way to tell.

Appropriate correction is required.

Information Disclosure Statement

9. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

10. The information disclosure statement filed in the specification fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Oath/Declaration

11. The Oath and Declaration are objected to because of unclear information. The examiner has noticed that formerly all inventors of the invention had the same address. The examiner is requesting confirmation that only the post office address of Mr. Paul Lippens has changed and that the other inventors' addresses have not. If this is not a case, then a new Oath and Declaration is required.

Claim Objections

12. Claim 1 is objected to because of the following informalities: in line 2, the phrase "...which functional units..." contains awkward English in using the term "which" in the given context. Also, in that same phrase, there is some unclear matter regarding the use of "functional units" without an identifier such as "the" or "said". The examiner is taking the functional units to refer to the previously defined units because of the multiple reference characters that have been defined. The examiner suggests including such an identifier simply to remove any clarity issues. In conclusion, the examiner is taking the aforementioned phrase to mean, and suggests the phrase be changed to, "...where the functional units..." in order to resolve clarity issues.

13. Claim 2 is objected to because of the following informalities: the phrases “relatively large latency” and “relatively small latency” are unclear. The examiner is taking the phrases to mean that the “relatively large latency” is simply larger than the “relatively small latency” since there is no other latency to relate to.

14. Claim 3 is objected to because of the following informalities: the preamble refers to data processing when each of the preceding claims regarding the same subject matter refers to a data processing device. The examiner is taking claim 3 to also mean a data processing device and suggests it be changed to reflect so otherwise the claim is of improper dependent form for incompatible statutory subject matter.

15. The examiner has been instructed by the applicant to view claim 6 as a dependent claim with knowledge that the following objection would be made. Claim 6 is objected to because of the following informalities: Claim 6 is a method claim that refers back to a device claim resulting in improper dependent form due to incompatible statutory subject matter. However, the applicant is warned that if this claim is changed to an independent claim, a restriction may be warranted due to related subcombinations usable together. Claim 6 is also of improper dependent order since dependent claims should not be separated by any claim that does not depend on the same parent claim, as show in MPEP 608.01(n).

16. Claim 7 is objected to because of the following informalities: line 15 contains the misspelled word “characterised”, which should be spelled “characterized”.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

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17. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

18. Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

19. Claim 1 recites the limitation "the input data" in line 7. There is insufficient antecedent basis for this limitation in the claim. Though input operations have been specified, no input data has been previously defined as a part of this operation. The examiner is taking "the input data" to mean "input data" to be consistent with the introduction of the phrase "output data".

20. In claim 1, the phrase "...input data is generated by the second functional unit during execution..." is unclear. There is no clear indication of what the input data generated by the second unit is used for. The examiner is taking the phrase to mean "...input data generated by the second functional unit is processed by the first functional unit during execution..." in the same form as describing the output data and remaining consistent with the specification and drawings so that it can easily be seen what the input data is doing. Also, it is unclear how the execution of an instruction by the first functional unit can be described in terms of outputting data to a second functional unit where it is then processed during execution. It seems that if execution is done in a first functional unit it is inconsistent to be later described as being done in a second functional unit. The examiner is taking the claim to read "...the device being

programmed for executing an instruction, the execution..." where the phrase "by the first functional unit" has been omitted so that execution can include both functional units.

21. Claims 1-6 all include reference characters are unclear. Examiner is unable to ascertain if the characters are meant to aid in the examiner's understanding of them or further limit the claims to mean the specific unit referred to. The examiner suggests removing the reference characters so that the claims do not receive any unintended narrowing limitations.

22. Claims 1, 4, and 6 are objected to because of the following informalities: the term "and/or" is unclear. The examiner is taking the term to mean that both limitations referred to are required OR only one of the limitations is required as consistent with the standard use of the term. However, there is no indication in the specification hinting toward one way or the other. In claim 1 for example, there is no description on if one functional unit must wait for the input data from the other functional unit before it can then output back to that functional unit for example. Therefore, the examiner is simply interpreting the claim as its broadest reasonable interpretation by using the alternative language, which renders the meaning that one of the functional units receives data from the other. This interpretation using the alternative language is also held with claims 4 and 6.

Claim Rejections - 35 USC § 102

23. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

24. Claims 1-7 are rejected under 35 U.S.C. 102(e) as being anticipated by O'Connor (6,266,766).

25. In regard to claim 1, O'Connor discloses a data processing device, at least comprising a master controller, a first functional unit (figure 1, element 10) which includes a slave controller, a second functional unit (figure 1, element 20), where the functional units share common memory means (figure 1, element 30), the device being programmed for executing an instruction, the execution of said instruction involving input/output operations by the first functional unit, wherein output data of the first functional unit is processed by the second functional unit during said execution and/or input data generated by the second functional unit is processed by the first functional unit during said execution. Column 1, lines 16-17 and lines 28-32 show that the disclosed processor executes (processes) instructions. Figure 1, shows that the first execution unit outputs data processed by the second functional unit and data input to the first functional unit by the second functional unit. This is done during execution because the data is then executed by the execution units. Column 1, lines 32-53 shows that the processor uses interlocks when data is not ready. The bypassing function eliminates some need for interlocking as stated, but not all since an interlock is still needed if the appropriate data has not been executed and ready for bypassing.

Therefore, interlocking exists in the processor and inherently there is a master controller

to control the interlocks. Column 2, lines 9-10 and figure 2 show that there is a separate controller for controlling the bypass functionality. This is the slave controller.

26. In regard to claim 2, O'Connor discloses a data processing device according to claim 1, characterized in that the first functional unit is arranged for processing instructions of a first type corresponding to operations having a relatively large latency and in that the second functional unit is arranged for processing instructions of a second type corresponding to operations having a relatively small latency. Column 1, lines 54-61 disclose that each of the execution (functional) units take varying amounts of time to complete. Therefore, it is disclosed that the first functional unit takes longer than the second. Thus the first functional unit processes operations of a relatively large latency and the second functional unit of a relatively small latency in comparison to each other.

27. In regard to claim 3, O'Connor discloses a data processing device according to claim 1, having halt means controllable by the master controller for suspending operation of the first functional unit. As shown above, the master controller is used for implementing interlocks (halt means), or suspending execution, if the data is not ready. So if data for the first functional unit is not ready and cannot be bypassed, the first functional unit is halted.

28. In regard to claim 4, O'Connor discloses a method of operating a data processor device, which device comprises at least

- a. a master controller for controlling operation of the device; Column 1, lines 32-53 shows that the processor uses interlocks when data is not ready. The bypassing function eliminates some need for interlocking as stated, but not all

since an interlock is still needed if the appropriate data has not been executed and ready for bypassing. Therefore, interlocking exists in the processor and inherently there is a master controller to control the interlocks.

b. a first functional unit (figure 1, element 10), which includes a slave controller, the first functional unit being arranged for executing instructions of a first type corresponding to operations having a relatively long latency; Column 1, lines 16-17 and lines 28-32 show that the disclosed processor executes (processes) instructions. Column 2, lines 9-10 and figure 2 show that there is a separate controller for controlling the bypass functionality. This is the slave controller. Column 1, lines 54-61 disclose that each of the execution (functional) units take varying amounts of time to complete (because of different types of instructions). Therefore, it is disclosed that the first functional unit takes longer than the second. Thus the first functional unit processes operations of a relatively large latency in comparison to the second unit.

c. a second functional unit (figure 1, element 20) capable of executing instructions of a second type corresponding to operations having a relatively short latency, wherein the first functional unit during execution of an instruction of the first type receives input data and provides output data, according to which method the output data is processed by the second functional unit during said execution and/or the input data is generated by the second functional unit during said execution. As shown above, the first functional has a relatively long latency compared to the second unit so the second functional has a relatively short

latency compared to the first. Figure 1 shows how the second functional unit provides input data for the first functional unit and receives output data from the first unit. This is done during execution because the data is then executed by the execution units.

29. In regard to claim 5, O'Connor discloses a method according to claim 4, characterized in that, the master controller temporarily suspends operation of the first functional unit during execution of instructions of the first type. As shown above, the master controller is used for implementing interlocks (halt means), or suspending execution, if the data is not ready. So if data for the first functional unit is not ready and cannot be bypassed, the first functional unit is halted.

30. In regard to claim 6, O'Connor discloses a method for compiling a program into a sequence of instructions for operating a processing device according to claim 1, according to which method

- a. a model is composed which is representative of the input/output operations involved in the execution of an instructions by a first functional unit,
- b. on the basis of this model instructions for the one or more second functional units are scheduled for providing input data for the first functional unit when it is executing an instruction in which said input data is used and/or for retrieving output data from the first functional unit when it is executing an instruction in which said output data is computed.

The model of this claim has been described to perform the same operations as the processing device for the purpose of compiling. It is inherent that instructions executed

on the data processing device of claim 1 be compiled based on the devices operation or a model of it so that the program can run on the device.

31. In regard to claim 7, O'Connor discloses a method according to claim 6, characterized in that the model is a signal flow graph. The applicant defines a signal flow graph in the specification to "describe the primitive operations performed in the code, and the dependencies between those operations." It is inherent that the primitive operations performed in the code are described in the model of the processing device so that the processing device can perform the operations. It is also inherent that the model describe the dependencies between the operations so that the processing device can deal with the dependencies between them as the device is shown to do in the abstract.

Conclusion

32. The following is text cited from 37 CFR 1.111(c): In amending in reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are described to further show the art with respect to interaction of multiple functional units having different latencies.

US Pat No 6,378,061 to Carbine describes a data processing device with multiply-divide and simple execution units that send data between one another.

US Pat No 5,481,736 to Schwartz discloses a computer processor with a longer latency multiply unit and shorter latency ALU where the results of each are fed back to each unit.

US Pat No 5,465,368 to Davidson shows a data flow machine with a multiply unit and ALU unit that share results.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shane F Gerstl whose telephone number is (703)305-7305. The examiner can normally be reached on M-F 6:45-4:15 (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (703)305-9712. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

Shane F Gerstl
Examiner
Art Unit 2183

SFG
January 13, 2004



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